

## **Portable Sawmills in a High-value Rainforest Cabinet Timber Industry in North Queensland <sup>1</sup>**

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This paper examines the role and use of portable sawmills in north Queensland. Using a semi-structured questionnaire and personal interviews, the opinions of 18 operators of portable and fixed-site sawmills were canvassed on a number of issues including main problems faced by the local industry, current sources of timber, sawn timber recovery rates of their operations, willingness to purchase new milling and other equipment, opinions about why (or if) portable sawmills can sell timber at a lower cost than fixed-site mills, and destinations of sawn timber milled. The most critical issues faced by sawmillers were the lack of resource security and competing products, in particular competition from imported tropical timbers from neighbouring island countries including Papua New Guinea. Most sawmillers in north Queensland currently obtain logs mainly from private landholdings and are hesitant to invest in new equipment due to concerns about future log supplies. This paper also explores the current and potential role of portable sawmills in the regional small-scale forestry industry. An examination of policy issues suggests that there may be a need for new legislation to cover employees, sawn timber consumers and sawmillers themselves. The future role of portable sawmills may require a co-operative approach that emphasizes low volume value-adding, due to the decreasing supply of logs in North Queensland.

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## INTRODUCTION

There has been much interest in the use of portable sawmills in relation to farm forestry in Australia. However, formally documented research on portable sawmills is lacking (FORTECH 1994). Various models are available of circular saws and bandsaws, which are readily movable between sites, and can be taken to the forest so as to avoid having to transport logs to a fixed-site timber mill. In Australia, current stumpage prices paid for timber from native forests are relatively low, of the order of \$40/m<sup>2</sup> to \$50/m<sup>3</sup>. Portable sawmills may be a means of increasing returns to landholders by offering a more cost-effective alternative of processing timber and thus allowing a higher stumpage price to be paid, and allowing landholders to 'value-add' their timber resource on-farm.

FORTECH (1994) noted that portable sawmilling in Australia is a highly informal sector and thus the characteristics are difficult to quantify. The lack of formal sources of statistics on production from this sector, and absence of published work on relative efficiencies and costs of production and quality of output, were also noted. Hunt (2002) encountered a similar lack of data in Papua New Guinea, noting that the overall importance of portable sawmills is difficult to assess, given the lack of data on their production and sales.

The cost of the milling operation is an important element in the overall cost structure of sawmillers. It is useful to differentiate milling costs from costs such as log acquisition, felling, snagging and haulage, as well as from other value-adding activities such as drying, timber treatment and processing into mouldings.

In spite of the apparent advantages of portable sawmills, there has been some resistance to their use. For example, Laidlaw (1997) noted that Forestry Tasmania does not permit portable sawmilling of any kind in State Forests in Tasmania. This is because such an activity is a potential source of fire and portable sawmilling is difficult to regulate.

In Queensland, under the *Sawmill Licensing Act (Qld) 1936*, sawmills must be licensed with the Primary Industries Corporation. As of 1996-97 there were 276 fixed-site and 112 portable sawmills licensed in the State, with some licensed portable sawmills operating at fixed locations. In addition to licensed portable sawmills, there are portable sawmills that do not fall within the definition of a sawmill under the *Sawmill Licensing Act (Qld) 1936* because the blade moves over a stationary log and licensing is not mandatory.

Fixed-site sawmillers in Queensland have been found to be reluctant to provide information on their commercial activities, much of which is regarded as commercially sensitive (Bennett 1990). There also appears to be distrust of any researchers due to the 'experiences' sawmillers have encountered with the 1988 World Heritage listing of the Wet Tropics of Queensland, which effectively terminated their access to native forest cabinet timber resource on public land. However, sawmillers do appear amenable to one-on-one discussions where they are willing to express their views on aspects relevant to their operations. In these instances the sawmillers often provide useful insights into the sector and frequently provide intimate details of their operations that would not be forthcoming under a more structured approach. While some research on portable sawmilling has been undertaken in other Australian states (Margules Groome Poyry Pty Ltd *et al.* 1995,

Stewart and Hanson 1998), and in other countries (Verissimo *et al.* 1992, 1995; Barros and Uhl 1995), little research has been undertaken in north Queensland.

This paper discusses a number of practical and policy issues associated with sawmilling in north Queensland and the role that portable sawmills may play. While this discussion focuses on north Queensland, most of the comments are generally applicable throughout Australia. This paper further examines the operational framework for portable sawmills and reports on their current uses in north Queensland. Finally, the potential use of portable mills in a developing a plantation-based farm forestry industry is discussed.

## RESEARCH METHOD

### Selection of the Population Sampling Frame and Sample

As well as the approximately 400 sawmills licensed under the *Sawmill Licensing Act 1936*, anecdotal evidence suggests that there are approximately 300 unlicensed portable sawmills in Queensland of which approximately 100 are accredited with the Australian Portable Sawmill Association Pty Ltd (Goodman 1998). The Queensland Department of Primary Industries (DPI 1998) reported a total of seven fixed-site sawmills operating in north Queensland. A sample of size 19 fixed-site and portable sawmills was obtained with one fixed-site sawmiller refusing to be interviewed. The sawmills were from an area from Ingham to Cairns and the Atherton Tablelands.

### Development of Questionnaires for the Sawmill Operator Survey

A survey was conducted to collect quantitative and qualitative data on the operations and problems facing small sawmills. For this survey, a questionnaire was developed from discussions with mill staff during visits to two fixed-site sawmills, information provided by portable sawmill manufacturers and their agents, and published material. The questionnaire was tested with a sawmiller from south-east Queensland, after which it was revised following concerns that much of the information being sought was of a commercially sensitive nature. The revised questionnaire was retested with a sawmiller from north Queensland. Two versions of the questionnaire were then developed, one for portable sawmillers and one for fixed-site sawmillers. These were substantively similar but reflected the slight differences in the type of operation and form of information sought from the two groups of sawmillers.

The questionnaire consisted of a combination of closed and open-ended questions. Open-ended questions were used to seek sawmillers' opinions and insights into the industry. With the open-ended questions, the interviewer sometimes posed supplementary questions to explore further and clarify the issues raised in the initial responses. Much of the data sought through closed questions was of a commercial nature, with questions related to sawmill cost structures, age of equipment and sources of log inputs.

The questionnaire covered four broad areas. First, information was sought on issues affecting the sawmilling industry and the individual firms. Second, information was sought about sources of log resources, volume of timber milled and acquisition of logs. Third, specific questions were included relating to the operation of sawmills such as type of equipment used, number of employees, sawn timber recovery rates and factors affecting the level of recovery. Finally, more general

questions were framed about the role of portable sawmills in the industry and their relationship with fixed-site sawmills. Finally, open-ended questions were included which required general comment on issues pertaining to the industry and their impact on the individual firm, covering the following areas:

- main factors affecting sawmiller's current and future milling activities;
- whether the sawmiller had any plans to acquire new milling or associated equipment in the near future and if so what type of equipment;
- main difficulties faced in sourcing logs;
- whether sawmillers regard portable sawmills as complementary or competitive with fixed site-sawmills;
- whether it would be feasible to replace a fixed-site sawmill with a number of portable sawmills and achieve higher recovery rates and higher profitability while maintaining throughput; and
- how sawmillers view the future of the timber industry in north Queensland.

Sawmillers were personally interviewed at the site of the sawmilling operation. This approach was chosen to overcome the reluctance of sawmillers to provide information about their operations. In addition, the visits allowed the interviewer to assess the range and condition of milling equipment.

### **Classification of Sawmillers**

Responses of the structured questions were analysed on the basis of three classifications of the data, viz. 'sawmill licence held', 'function' and 'usage'. Sawmills were allocated to the respective categories on the basis of information obtained from the sawmillers, observation of their milling activities, and statistics on sawmill licenses obtained from DPI Forestry. If the sawmill was not licensed, then it was allocated to the 'No licence' (NL) category. Mills that fall into this category are smaller portable mills such as the Lewis and Lucas brand circular saws which fall outside the licensing definition. The remaining mills were categorised according to the license type taken out, viz. fixed- site or portable. Thus it is feasible for a small mobile mill to fall into any one of the three categories. (Mills which fall outside the definition under the Act may still be registered and licensed, should the owner wish.) A licensed mill could be either a fixed-site or mobile mill.

The functional classification was made on the basis of observation of the milling activities and through talking to the millers. The three classifications in this category are 'Fixed-site' (FS), 'Portable Sawmill - mobile' (PSm) and 'Portable Sawmill - fixed-site' (PSfs). Fixed-site sawmills are those that operate from a permanent site and conduct their activities as if they were a traditional fixed-site sawmill, with covered work areas and associated equipment such as docking saws and bench saws.

The usage category – with sawmillers being classified as either full-time or part-time operators – is designed to differentiate between millers attempting to earn a living from operating the sawmill as opposed to those operating on a hobby (recreational) or semi-commercial basis.

## SURVEY FINDINGS

The results of survey data analysis are presented below, and cover aspects such as: important issues for the sawmillers; source, species and number of species milled; recovery rates and timber milling costs.

### Timber Resource Security

Respondents were asked to rank five factors identified as issues that may be affecting the sawmilling industry in north Queensland (Table 1). Lack of resource security and the competition from imported timbers were clearly regarded by sawmillers as being the most important of these factors with an average overall ranking of 4.2 and 3.9 respectively.

Some patterns are evident among intra-group categories. For instance, fixed-site and licensed portable millers rate low-priced imports higher than resource security. Those millers who are unlicensed, on the other hand, rate 'resource security' much higher than 'competition from imported timbers'. Similar rankings occur for fixed-site as opposed to portable and mobile sawmills in the function classification, and full-time versus part-time in the usage classifications. This higher concern for imported timber may stem from greater awareness of the competition due to selling larger volumes to timber merchants who import timber as well.

Restrictions imposed by the *Queensland Sawmill Licensing Act 1936* do not appear to be a concern although the unlicensed mobile sawmill operators appear to rank this higher than the others (perhaps due to lack of knowledge of the implications of this legislation).

The high average ranking of competition from imported timbers is notable. A number of millers reported that timber merchants are landing a sawn timber similar to Queensland Maple in Brisbane for \$800/m<sup>3</sup>. The millers are of the opinion that they are unable to produce sawn timber at this price, due to factors such as reduced resource availability in north Queensland resulting from World Heritage listing, increasing restrictions being placed on harvesting from private land such as those introduced by the Douglas Shire Council, and higher labour costs than in developing countries from which the timber is imported. In addition, the millers claim that environmental pressures in Australia and the many associated rules and regulations result in production costs far exceeding those in the developing countries. A further issue associated with competition is that timber merchants are willing to pay a price premium for imported timbers such as 'Brazilian Oak' due to the continuity of supply and reliable availability.

The findings of the current survey suggest that not all sawmillers in north Queensland hold opinions similar to those expressed by those surveyed as part of the study undertaken by FORTECH (1996). FORTECH (1996, p. 18) stated that 'all participants wished to make it very clear that the key issue facing the wood and paper industry at present is that of resource security and that all factors relating to enterprise development are subsidiary to this'. In the current survey, operators of licensed full-time fixed-site mills and particularly mills located on the coastal plain ranked resource security lower than those on the Atherton Tableland. This is perhaps due to land clearing on the coastal belt at the time of the survey, making timber available to millers. Some millers held the opinion that if all timber importation were to cease, they would not be able to meet market demand for timber due to lack

**Table 1.** Average ranking of factors affecting sawmillers' current and future sawmilling activities (1= least important, 5 = most important)

Classification	n	Lack of resource security	Old equipment	Low priced imported timbers	Low milling recovery	Restrictions imposed by <i>Sawmill Licensing Act</i>
<b>License</b>						
Licensed as fixed-site	8	4.0	2.1	4.5	2.6	1.6
Licensed as mobile	4	3.5	2.5	3.8	1.0	1.3
No licence	6	4.8	1.8	3.2	1.8	2.3
<b>Function</b>						
Traditional fixed-site	6	4.0	2.3	4.5	2.3	1.8
Portable mill – mobile	3	5.0	1.7	2.7	1.3	2.3
Portable mill – fixed-site	9	4.0	2.1	3.9	2.0	1.6
<b>Usage</b>						
Full-time	14	4.0	2.0	3.9	1.9	1.8
Part-time	4	4.8	2.5	3.8	2.3	1.8
<b>Overall</b>	18	4.2	2.1	3.9	2.0	1.8

of resource. Millers argued there is a need to redress the inequalities – such as stricter Australian environmental and labour legislation with commensurate costs – by placing them on an equal footing rather than reducing competition by restricting imports.

### **Source of Timber Acquired for Milling**

Cessation of logging of Public rainforests as a result of their World Heritage listing has forced millers to obtain timber from alternative sources, particularly native forest on freehold land and imports. The majority of logs are sourced from millers 'own' land and from other 'private' suppliers (Table 2). Eight of the 14 millers (57%) source all their timber from 'private' landholding, and a further six obtain at least 30% from this source. Six of the seven millers who obtain logs from their 'own' land obtain 50% or more from this source. Only two millers obtain logs from Crown forests. One miller obtains all timber (eucalypt) from this source, and the other 5% only. Three millers obtain logs from 'other' sources, one of whom only mills on a contract basis, another for whom contracting accounts for 20% of logs milled, and the third (a hobbyist/recreational) obtains logs from land subdivisions where land is cleared for road development.

Some millers have made provision for long-term resource security by buying land carrying rainforest. This requires finance which may otherwise have been utilised to acquire further value-adding equipment or updating existing equipment.

### **Number and Type of Species Milled**

Unlike softwood mills which process standard sized logs of a particular species or a limited number of species with similar properties, north Queensland hardwood mills generally handle a wider variety of species. Furthermore, hardwoods from native forests vary considerably in both size and quality, often containing more defects than plantation trees, such as hollow centres. The impact that this has on the milling operations in terms of the additional handling time and reduced throughput is difficult to assess. It is unclear whether the higher prices for cabinet timbers compensate for the higher costs associated with these two factors.

All mills reported processing multiple species, with two thirds milling five or more species (Table 3). A claim made by proponents of both portable and traditional fixed-site sawmillers is that the opposing group 'pick the eyes out of the timber' on private land and leave the other group to pick up what is left. Based on the number of species milled, it would appear that fixed-site and portable fixed-site licensed mills operating on a full-time basis mill more species than the part-time unlicensed mobile mills (Table 3). This would tend to suggest that the unlicensed mobile portable sawmills take advantage of being more selective in the logs they mill.

Sawmillers purchase not only the 'primary' species used in high value products – e.g. Red Cedar (*Toona ciliata*), Queensland Maple (*Flindersia brayleyana*) and Northern Silky Oak (*Cardwellia sublimis*) – but also less sought after species which are used for structural timber which can frequently account for a high proportion of the trees harvested.

The major criterion upon which sawmillers base their timber purchases is species, with 12 of 14 respondents indicating they quote to purchase timber on this basis. Quality and diameter are also taken into account by nine and seven sawmillers respectively. Notably, fixed-site sawmillers indicated a willingness to quote on

**Table 2.** Source of timber acquired for milling

Classification	Sample size	Number of millers obtaining timber from each source (more than one source possible)				Millers obtaining timber from each source as a % of the total in each subcategory			
		Public	Private	Own	Other	Public	Private	Own	Other
<b>License</b>									
Licensed as fixed-site mill	12	1	7	4	0	8.3	58.3	33.4	0.0
Licensed as mobile mill	7	1	3	2	1	14.3	42.9	28.6	14.3
No licence	7	0	4	1	2	0.0	57.2	14.3	28.6
<b>Function</b>									
Traditional fixed-site	10	1	6	3	0	10.0	60.0	30.0	0.0
Portable mill – mobile	3	0	2	0	1	0.0	66.7	0.0	33.3
Portable mill – fixed-site	13	1	6	4	2	7.7	46.1	30.8	15.4
<b>Usage</b>									
Full-time	21	2	12	6	1	9.5	57.1	28.6	4.8
Part-time	5	0	2	1	2	0.0	40.0	20.0	40.0
<b>Overall</b>	26	2	14	7	3	7.7	53.8	26.9	11.5



**Table 3.** Number of species milled by sawmills by mill categories

Classification	n	Average number of species milled			Percentage of millers in each group		
		1 species	2 to 5 species	5 or more species	1 species	2 to 5 species	5 or more species
<b>License</b>							
Licensed as fixed-site	8	0.0	4.0	35.6	0.0	12.5	87.5
Licensed as mobile	4	0.0	5.0	21.7	0.0	25.0	75.0
No licence	6	0.0	4.0	14.5	0.0	66.7	33.3
<b>Function</b>							
Traditional fixed-site	6	0.0	0.0	40.0	0.0	0.0	100.0
Portable mill – mobile	3	0.0	3.5	20.0	0.0	66.7	33.3
Portable mill – fixed-site	9	0.0	4.5	16.6	0.0	44.4	55.6
<b>Usage</b>							
Full-time	14	0.0	4.0	28.6	0.0	14.3	84.7
Part-time	4	0.0	4.3	0.0	0.0	100	0.0
<b>Overall</b>	18	0.0	4.2	28.6	0.0	33.3	66.7

individual species or on a generic price basis depending on the landholders' requirements.

Four millers indicated that they would quote for timber on the basis of a generic price for all timber in the area to be logged, i.e. taking allailable logs irrespective of species or quality (Table 4). In contrast, unlicensed portable sawmillers usually purchased timber on the basis of species and quality. This may in part account for 'portable' sawmillers offering higher stumpage prices.

**Table 4.** Basis of purchase (number of respondents =14)

License	Generic price	Species	Diameter	Quality
Licensed as fixed-site	4	6	3	3
Licensed as mobile	0	3	3	3
No licence	0	3	1	3

### Recovery Rates and Their Impact on Cost Structures

Recovery rate ( $\text{m}^3$  sawn timber as a percentage of log volume) is one of several important factors influencing sawmill profitability. This rate depends on the ability, experience and skill of the miller, the nature of the mill (bandsaws have smaller kerf than circular saws), species of tree cut, dimensions of the sawn timber cut and quality and dimensions of the log input. Recovery rate affects both cost and revenue of the miller.

Anecdotal evidence suggests that portable sawmillers are able to achieve higher recovery rates than traditional fixed-site millers. Recovery rates reported in the survey support this view (Table 5). There are a large number of factors that can affect the recovery rate and the relative importance of each may vary between mills. On average, licensed and unlicensed part-time mobile and fixed-site portable sawmills indicated a recovery rate approximately 8% higher than licensed full-time fixed-site sawmills. The average rates indicated by sawmills would appear to be in line with data provided by Queensland Timber Board (1996) for fixed-site sawmills.

**Table 5.** Milling recovery rate expressed as a percentage of round log volume

Function	n	Mean	Median	Highest	Lowest
Traditional fixed-site	6	34.7	34.2	50.0	25.0
Portable mill – fixed-site	15	42.6	42.0	55.0	30.0

The average recovery rate reported for fixed-site mills in Table 5 of 36.4% is close to those previously reported for fixed-site mills in Australia (Bennett 1990; Qld Timber Board 1996). The average recovery rate for portable sawmills is 42.6%, with a maximum reported recovery rate of 55% (Table 5). These recovery rates contrast with claims of promoters of portable sawmills of 60% to 70%. In a study of recovery rates achievable by portable sawmills, Hasek and Ponce (1973) stated that 'the loss was negligible and the yield high, approximately 64%, resulting from the good quality and excellent condition of the log.' However, a log of lower quality would not necessarily produce a similar recovery rate. In another example of high recovery rates, Mamun and Konabe (1992) cited a successful portable sawmill operated by a

family group in Papua New Guinea consistently achieving a rate of recovery of more than 55%. Gan *et al.* (1985) quoted recovery rates for portable sawmills ranging from 22% to 47% depending on the cultivars of Heveawood (rubberwood) being milled. Low recovery rates can be expected from tree species where the quality and condition of boles is not high or uniform. Hunt (2001) noted that the uniform logs of plantation timber have a higher recovery rate than native forest trees.

Fixed-site sawmillers claim that recovery rates in the 60% to 70% range are generally not feasible under the conditions in which fixed-site mills operate, where highly selective harvesting is not possible and all millable timber is harvested. Circumstances are further complicated in north Queensland by the large number of native timber species available for harvest. There are approximately 800 rainforest tree species<sup>2</sup> of which about 600 reach sawlog size, but only about 150 of these are harvested for timber (Poore 1988). The lack of standardisation of inputs associated with high species diversity reduces the recovery rates achieved by fixed-site mills. It is also likely that the larger fixed-site mills aim for higher throughput so they spend less time in assessing and arranging each log for optimal cutting patterns.

An interesting point made by one sawmiller who operated a number of portable mills on a fixed-site basis was that whilst there is much talk about negative impact on recovery rates of the wide kerf of blades used in fixed-site sawmills, this impact is limited to the 'breakdown saw', the use of which is restricted to cutting logs in half (one cut) or in quarters (three cuts) for large logs. Subsequent milling is carried out on a bench saw, the kerf of which does not differ greatly from that of a Lucas or Ecosaw portable circular saw.

Sawmillers were asked to rate a number of factors in terms of their importance in reducing recovery rates (Table 6). The higher overall average rating of 4.1 and 4.4 for small logs and low log quality is not surprising. The low rating of the negative impact of old technology on recovery rates by portable sawmills is contrasted by the higher rating by traditional fixed-site sawmillers. This would support the assertions that the old technology used by traditional fixed-site sawmills is a major contributor to low recovery rates. Some traditional fixed-site sawmillers expressed the view that newly available technology would make little difference to recovery rate due to the dominance of other negative factors such as log size variation, log quality and the species they mill. Furthermore, sawmillers suggested that much of the new technology is designed for softwood sawmills which receive plantation logs of uniform size, species and quality, and is not suitable for their operations. The high rating for milling 'multiple species' by fixed-site sawmillers corresponds with the large number of species they mill (Table 3). In contrast, the high rating of the effect of small logs and poor quality and small boards cut by the portable sawmillers may be a reflection that these sawmillers generally cut higher quality timber and struggle for high recovery rates when they have to cut timber that the fixed-site sawmills usually cut.

The sawmillers interviewed were unable to provide a definitive figure as to the cost of milling timber, due to the variety of species milled, varying recovery rates depending on species and log quality, lack of detailed cost recording, and commercial sensitivity of the information. However, some estimates were provided, as reported in Table 7.

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<sup>2</sup> Hyland and Whiffin (1993) identified 1056 taxa present as trees in Australian tropical rainforests.

**Table 6.** Average rating of factors negatively affecting recovery rate (1 for extremely unimportant through to 5 for extremely important)

Function	n	Multiple species	Small log	Poor quality	Lack of experience	Old technology	Small boards cut	Wide kerf of blade
Traditional fixed-site	6	4.2	2.7	3.7	4.3	3.7	2.7	3.5
Portable mill	12	3.1	4.8	4.8	3.1	2.2	3.7	3.4

**Table 7.** Sawmillers' cost of milling timber

Classification	n	No. who do not know	No. who contract	Lowest (\$)	Highest (\$)	Average (\$)	Median (\$)
<b>License</b>							
Licensed as fixed-site	8	8	7	112.00	200.00	148.86	140.00
Licensed as mobile	5	5	4	140.00	250.00	170.00	145.00
No licence	7	7	6	80.00	150.00	128.33	135.00
<b>Function</b>							
Traditional fixed-site	6	6	6	112.00	200.00	150.33	147.50
Portable mill – mobile	4	4	4	120.00	150.00	135.00	135.00
Portable mill – fixed-site	10	10	7	80.00	250.00	150.00	140.00
<b>Usage</b>							
Full-time	16	16	15	112.00	250.00	150.80	140.00
Part-time	4	4	2	80.00	150.00	115.00	115.00
<b>Overall</b>	20	20	17	80.00	250.00	146.59	140.00

Anecdotal evidence suggests that portable sawmillers are able to mill timber at lower cost than traditional fixed-site sawmills for a variety of reasons. However, if the overall median contract price is compared with the average for each sub-category, there appears to be little difference except for the 'part-time' operated sawmills in the usage category (Table 8). The lower cost estimates by this group may arise because they underestimate some of the fixed or sunk costs associated with their operations.

In an attempt to gain a better understanding of industry views on factors that enable portable sawmillers to operate at lower cost, respondents were asked to rate nine factors on a scale of 1 to 5 as to their importance in reducing overall costs for portable sawmillers. The two most important cost advantages identified by portable over fixed-site sawmillers are lower capital requirement and absence of workers compensation payments (Table 8). The reduced capital requirement received a high rating by sawmillers in all categories. Fixed-site sawmillers consistently gave Workers Compensation and Health and Safety legislation a higher rating than other respondents. Part-time mobile portable sawmillers also rated this factor highly. This is not necessarily an admission of non-compliance with the requirements of the Workers Compensation and Workplace Health and Safety legislation but rather may be due to many of the portable sawmills being one- or two-man owner-operators, without any employees.

Higher recovery rates may also assist portable millers to mill at a lower cost than fixed-site sawmillers. Operators of unlicensed part-time mobile sawmills expressed the opinion that the higher recovery rates achieved are significant in reducing their overall costs. Based on figures provided on recovery rates in Table 5, the difference of about 8% would improve the sawmill's financial viability. Fixed site sawmills did not rate this factor highly, which is surprising because recovery rate improvements should reduce unit costs of all sawmillers. The lower rating may however stem from the belief that portable sawmills do not achieve higher recovery rates than other mills.

Of the sample of 18 sawmillers, 11 (61%) reported they had no plans to make further investment in equipment (Table 9). The lack of resource security combined with the increasing competition from softwoods, imported timbers and alternative products such as plastic and steel does not provide a positive investment climate. For some millers there was some indication of interest in investing in value-adding equipment such as kilns and moulding machines rather than milling equipment.

## CONCLUDING COMMENTS

The survey clearly identified a number of aspects affecting the sawmilling industry in north Queensland. Major concerns relate to resource security and competition from lower priced imports. There is, however, also belief that a lack of resource means that domestic demand for rainforest cabinet timbers cannot be met by north Queensland sawmillers. This may suggest a long-term future for these sawmillers if the timber resource on private land is managed and a low-volume high-value industry is built on this resource.

**Table 8.** Average rating of reasons why portable sawmills can mill timber at a lower cost

Classification	n	Don't pay towards industry costs	Less capital outlay & thus lower break-even point	Don't meet cost costs associated with the Sawmill licensing	Owner operators are more motivated and thus more productive	Don't comply with Workers Comp. and Workplace Health and Safety Acts	Do not comply with the Environ. Protection Act	Do not comply with the Timber Utilisation and Marketing Act	Nature of the operations make portables more efficient in terms of labour usage	Higher recovery rates achieved
<b>License</b>										
Licensed as fixed-site	8	2.6	4.0	2.9	2.9	4.0	3.3	4.0	2.0	2.3
Licensed as mobile	4	2.3	4.0	2.8	3.5	4.8	4.0	2.3	3.3	2.5
No licence	6	2.7	4.0	3.0	4.0	3.5	3.3	3.5	3.7	4.8
<b>Function</b>										
Traditional fixed-site	6	3.0	4.0	3.4	2.3	4.7	3.7	4.5	1.8	1.5
Portable mill – mobile	3	3.7	4.7	4.0	5.0	4.0	3.3	4.0	3.3	5.0
Portable mill – fixed-site	9	1.9	3.8	2.2	3.6	3.6	3.3	2.6	3.4	3.7
<b>Usage</b>										
Full-time	14	2.8	4.0	3.2	3.2	4.4	3.6	3.6	2.6	2.7
Part-time	4	2.0	4.0	1.8	4.0	2.8	2.7	3.0	3.5	4.8
<b>Overall</b>	18	2.6	4.0	2.9	3.4	4.0	3.4	3.4	2.8	3.2

**Table 9.** Sawmillers' intention to purchase new milling equipment or associated equipment

Classification	Total	Number			Percentage		
		Yes	No	Maybe	Yes	No	Maybe
<b>Licence</b>							
Licensed as fixed-site	8	2	4	2	25.0	50.0	25.0
Licensed as mobile	4	1	3	0	25.0	75.0	0.0
No licence	6	2	4	0	33.3	66.7	0.0
<b>Function</b>							
Traditional fixed-site	6	1	3	2	16.7	50.0	33.3
Portable mill – mobile	3	1	2	0	33.3	66.7	0.0
Portable mill – fixed-site	9	3	6	0	33.3	66.7	0.0
<b>Usage</b>							
Full-time	14	5	7	2	35.7	50.0	14.3
Part-time	4	0	4	0	0.0	100.0	0.0
<b>Combined</b>	18	5	11	2	27.8	61.1	11.1

Most sawmillers obtain the majority of their logs for processing from private landholders. Most fixed-site sawmillers purchase and mill logs of multiple species. Portable sawmillers on the other hand often buy logs on the basis of a single species or single log of high quality and this creates an misleading impression that portable sawmillers pay higher log prices.

Sawmillers, as is the case with many small business operators, do not keep appropriate records to allow estimation of milling costs. Any attempt to calculate milling cost is further complicated by the multiple species milled and variations in recovery rate depending on a number of factors. However, sawmillers are willing to quote contract-milling costs for milling logs and some respondents quoted a figure of \$700 to \$900 to purchase, mill and package a cubic metre of green sawn rainforest timber.

The potential exists for greater use of portable sawmills as complementary to fixed-site mills to reduce transport and other milling costs. This arrangement may also allow for greater utilisation of large branches which full-time portable sawmillers are currently reluctant to mill due to low recovery rates. The increased use of on-site milling may also hold environmental benefits with reduced volume of timber being milled and larger volumes of biomass being retained in the forest. The potential also exists for tourist visits to view portable sawmills in operation, together with other value-adding activities.

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